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ARMY TECHNICAL INTELLIGENCE REVIEW

PART 1

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ARMY TECHNICAL INTELLIGENCE REVIEW No. 87

PART I - OCTOBER 1967

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ARMY TECHNICAL INTELLIGENCE REVIEW No. 87 - PART I

FOREWORD

As foreshadowed in the "Army Technical Intelligence Review No. 86" this publication now appears in its new guise for the first time and with a wider circulation. There is little to add to what was said before and we eagerly await the criticisms of our "users".

The editorial committee, which now looks at all contributions from desks, while striving for reasonable uniformity of presentation, is also trying not to fit a straight-jacket round everything. In addition we are aiming at making the 'Review' easier to read.

Colonel G.S.
DI Tech Int(A)

Introduction

During World War II it became apparent to the Soviet Army that there was a requirement for vehicles for the transport of infantry which combined the qualities of mobility and protection from enemy fire with the ability for troops to be able to fight from inside the vehicle if required.

Early Types of APC

The first generation of Soviet APCs, which appeared in the early 1950s, were open, wheeled vehicles with lightly armoured vertical plates round the sides giving some protection against small arms fire. Soldiers could use their individual weapons from inside the fighting compartment with very little restriction; nevertheless they were exposed to hostile fire while they aimed.

Based on vehicle chassis that were already in existence these APCs were reliable, fast and had good mobility across country. The first of these, the BTR-152 became the standard APC of the Soviet Army and of several of the other Warsaw Pact armies. The second and smaller vehicle was the BTR-40 which was equally successful but was devoted largely to command and reconnaissance tasks.

Both these vehicles are still in service though they have now been largely replaced by the more sophisticated second generation APCs.

APCs in Present Use

The development of Soviet tactical doctrine has placed great emphasis on the maintenance of the momentum of an attack in the face of all obstacles. The design of a modern Soviet APC has thus to enable it to keep pace with the movement of tanks and lighter reconnaissance vehicles. The ability to cross water obstacles, to move and operate at night, to offer some protection against nuclear attack and to exploit a nuclear strike are essential.

The new APCs are therefore built as high mobility amphibians with sufficient armour to protect the troops from small arms, with infra-red night driving aids and, where possible, overhead cover.

Whether this mobility is best achieved by tracks or wheels has obviously not been settled by the Soviets; hence the arrival of two new APCs, the tracked BTR-50P and the wheeled BTR-60P. Both are amphibious and both are produced as open and closed versions.

Disadvantages showed by both these APCs are the necessity for entry and exit over the sides, which makes the occupants vulnerable and limits the use of arms by the occupants from within the vehicle.

VEHICLE DETAILS

BTR-152 6x6 APC

The BTR-152 first appeared in 1950. It is based on the ZIL-157 truck chassis and became the standard APC of Soviet and Sattelite armies. Basically an open vehicle there is a version with overhead cover (BTR-152K) and a command vehicle (BTR-152U). An interesting innovation is the centrally controlled tyre pressure regulating system giving increased mobility across soft ground.

Capacity - Dvr + 18

Weight - 8.95 t

Armament - 7.62-mm MG (on universal mount)

Max Road Speed - 40 mph (65 kph)

Length - 22 ft 5 in(6.83 m)

BTR-152U (Command Vehicle)

BTR-152 (Open Vehicle)

BTR-40 4x4 APC

The BTR-40, based on the GAZ-40 chassis, first appeared in 1951. It has many features in common with the American White Scout Car. Although obsolescent, it is still used as a command and recce vehicle.

Capacity - Dvr + 8

Weight - 5.3 t

Armament - 7.62-mm MG (on universal mount)

Max Road Speed - 50 mph (80 kph)

Length - 16 ft 5 in (5.0 m)

BTR-40

BTR-50P Tracked Amphibious APC

The BTR-50P first appeared in 1955, it is based on the chassis of the PT-76 Amphibious Tank and is in general service in the Soviet Army. It can be used either as a straightforward APC or to carry support weapons such as mortars or anti-tank guns. The BTR-50PK version has overhead cover and the BTR-50PU command vehicle can be distinguished by the addition of a second "bay window" in the front.

Capacity - Dvr, Comdr + 18

Weight - 14.5 t

Armament - 7.62-mm MG (on universal mount)

Max Road Speed - 27 mph (44 kph)

Length - 22 ft 8 in (6.91 m)

BTR-50PK

BTR-60P 8x8 Amphibious APC

The BTR-60P series is the newest of the Soviet APCs. It was first seen in 1961 since when it has replaced the BTR-152 in service in Motor Rifle Regiments. It is an impressive looking and extremely quiet running vehicle with a good performance in water. The BTR-60PK has overhead cover and the latest version the BTR-60PB has a small turret mounting both heavy and co-axial machine guns.

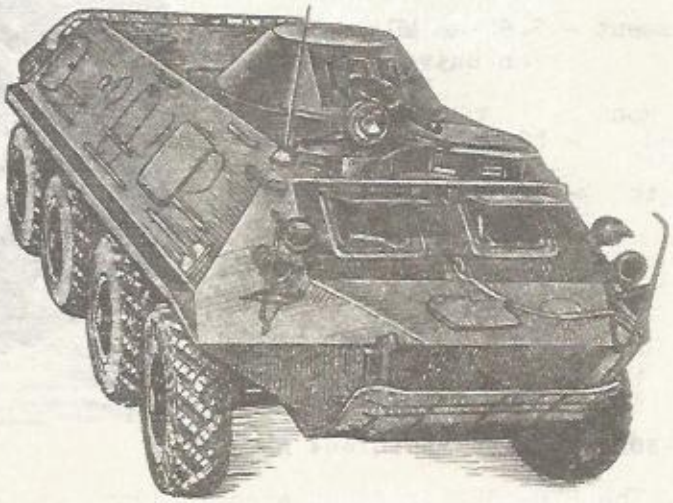
Capacity - Dvr + 16

Weight - 10 t

Armament - 7.62-mm MG
(PK & P) (on universal mount)

Max Road
Speed - 50 mph (80 kph)

Length - 23 ft 4 in (7.1 m)

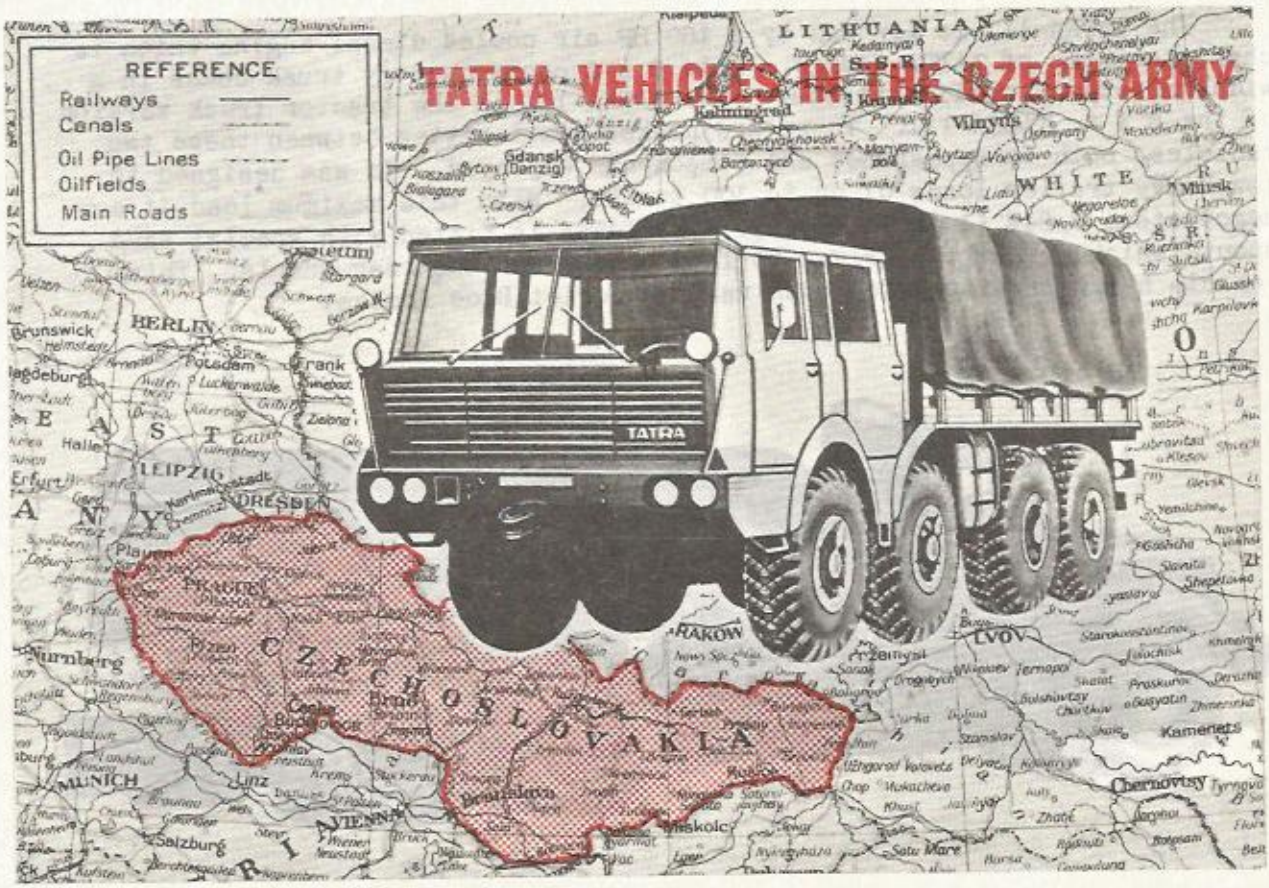


BTR 60-PB

Future Trends

Although it may be necessary for economic reasons to continue using the large numbers of BTR-50P and BTR-60P series APCs there is little doubt that these vehicles fall short of the ideal. Some improvement in the method of mounting and dismounting and greater freedom to fight from inside the vehicle in addition to the qualities of mobility and protection already provided should be expected in the next generation of the Soviet APC.

TATRA VEHICLES IN THE CZECH ARMY

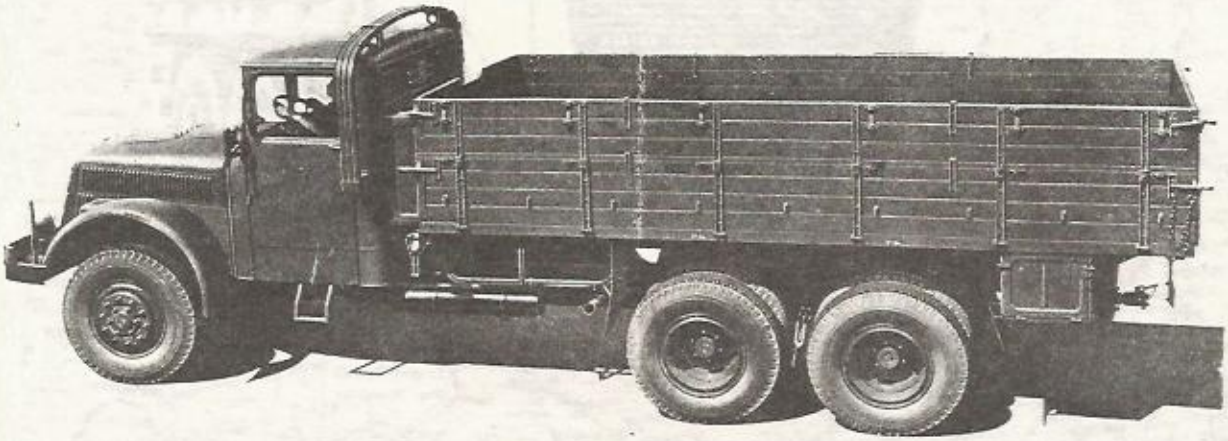


It may come as a surprise to many to discover that, except for the UAZ-69 light truck and a few other specialized Soviet trucks associated with advanced weapon systems, all motor transport found in the Czech Army is of native design and production. Czech motor vehicles are presently transporting the men and material of armies as far afield as the Middle East and Cuba.

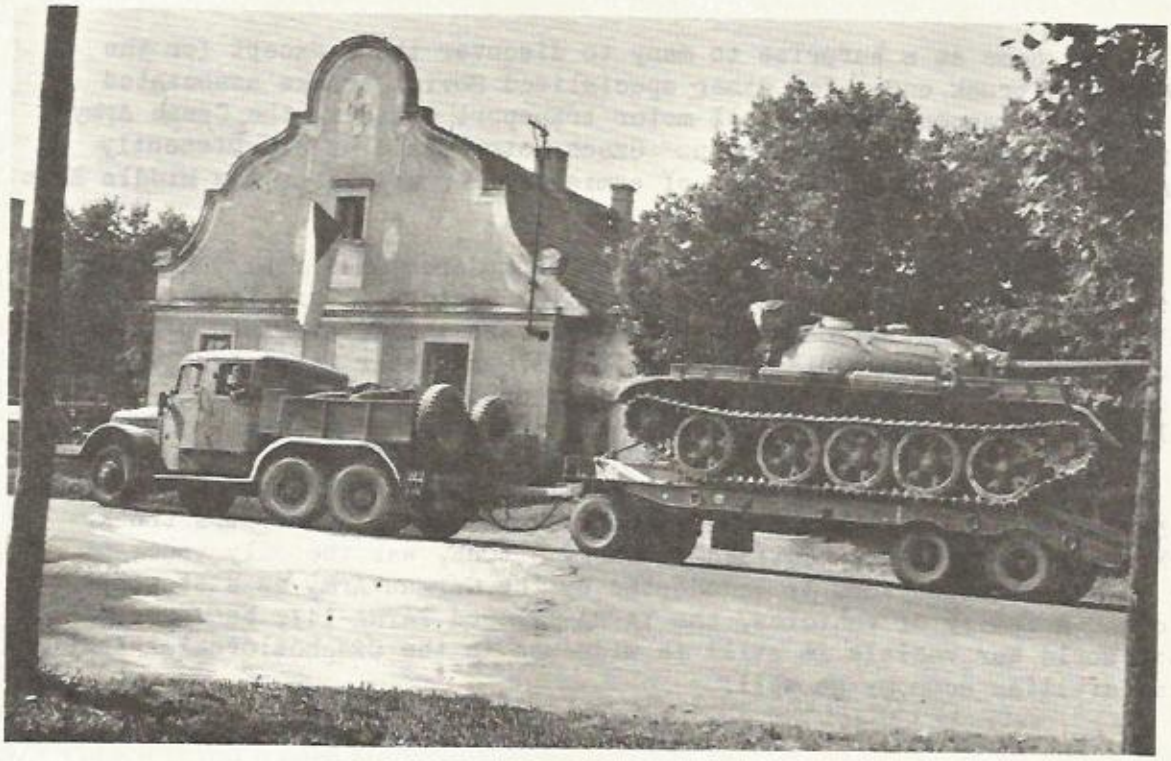
One of the prime reasons for this Czech independence from the automotive giants of the Soviet Union has been the TATRA Factory. This factory, developed under the Austro-Hungarian Empire, was the first Czech plant to produce an automobile. This was done in 1897 and their first truck was produced in 1900. From the very beginning, design and engineering excellence was stressed in preference to quantity production.

An interesting commentary on the quality of TATRA vehicles was provided by the German Army during the Second World War. The $6\frac{1}{2}$ ton Tatra truck, which was later slightly modified to carry 8 tons, was the only truck of more than $4\frac{1}{2}$ tons payload to be adopted by the German Army as a standard vehicle. A family of vehicles, the TATRA-111 and TATRA-141, based on this Second World War vehicle is still in wide use in the Czechoslovakian Army and in the civilian economy as well.

The TATRA-111 is powered by a 180 HP air cooled diesel engine which is characteristic of TATRA design. This 6 x 6 cross-country truck comes in a wide variety of configurations. The TATRA-141 is the tractor truck version of the 6 x 6, TATRA-111. There are marked similarities between these two vehicles, both in appearance and components employed. It was designed to tow heavy trailer loads of up to 100 tonnes. With this maximum load it can negotiate a 9.24% (1 in 10 slope). The TATRA is fitted with special sand spouts which permit the driver to feed sand under the rear wheels. This vehicle has been associated with various Soviet Bloc Armies.



TATRA-111R



TATRA-141

TATRA also has an entry in the 2 ton payload class. This is the TATRA-805 which is in wide military use in a multitude of roles. This 4 x 4 truck is also used to tow 57-mm anti-tank guns and recoilless weapons. Although still air cooled, the engine which powers this truck is also of the V-8 petrol type.

TATRA-805

TATRA-138

TATRA is not resting on its laurels. They have recently begun production of the TATRA-138 a replacement for the TATRA-111. It is a modern vehicle well suited for military cross-country operations and will no doubt be employed in many different roles. The new air cooled diesel engine found on this vehicle has the same capacity as the engine of the TATRA-111 but is smaller in size and lighter in weight.

Perhaps the high point of current TATRA development is the 8 x 8 TATRA-813. The TATRA-813 nicknamed "Colossus" for obvious reasons is again powered by a characteristically TATRA air cooled diesel. A unique feature of this vehicle is its seven differentials. The military version of this vehicle is intended to serve as a prime mover for heavy artillery weapons and AFV low loaders.

We can expect TATRA to continue to meet Czech demands and to increase its exports in a world wide competitive military market.

In the early days of the Royal Artillery there was a Rocket Troop which fired something resembling an overgrown firework. It probably frightened the firer rather more than the enemy, as it worked on the "light blue touch paper and retire" principle, and this has obviously put the British Army off them ever since - worse still they probably frightened the horses.

Not so the Russians. They have from the early days of the Red Army been very keen on rockets using them with devastating effect in the last war.

Their first Rocket Launcher was the 132-mm 16 Round BM-13.

BM-13 Rocket Launcher

It was the basic launcher of the Red Army during World War II but is now only used for training purposes, though still operational in several other foreign armies. The BM-13 launched a rocket weighing 94 lb to a range of 7000 m but was very much a first generation weapon and clumsy to use as the whole truck had to be moved to lay the launcher in the correct bearing.

It was therefore replaced in the early fifties by the BM-14-16, a 140-mm 16 Round Rocket Launcher. This fired a 90 lb rocket to 9000 m, with a warhead of about 30 lb. The traverse on the launcher itself was sufficient to allow 100° on either side of the centre of arc thus giving much more flexibility in its use, and greater speed in answering calls for fire.

There are several variants of this weapon, one of which is mounted on a field gun carriage for use by paratroops. It is air-droppable and gives an airborne unit a great deal of firepower as soon as it lands.

140-mm Rocket Launcher 16 Round (towed)

BM-14-16

The latest launcher that has been seen is the 115-mm? Rocket Launcher (40 Round) mounted on an URAL-375 truck. This formidable weapon sends a rocket with a warhead weight of about 50 lb to a range in the neighbourhood of 16,000 m.

The accusation levelled at this type of artillery is usually that of inaccuracy, which may well be so, but it is difficult to imagine that the Russians have not, after these long years of experience, managed to do something about this problem. Even if they have not, with its ability to put 40 x 50 lb warheads into a small area within 30 seconds, it is a formidable weapon.

115-mm? Rocket Launcher
(40 Round)

A RIFLE THAT FLOATS!

The Hungarians, like many other countries have substituted plastic for wood in their new 7.62-mm AK Assault Rifle. Plastic components have a number of advantages over wood; they are easier to produce, they cost less, and what is more important to the infantry man, the rifle weighs less.

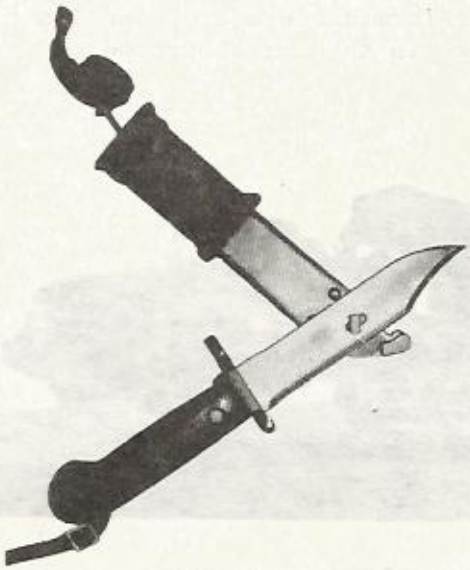
The reduction in weight coupled with the hollow butt has led to yet another characteristic in the Hungarian weapon - it floats!

This new rifle also incorporates the multi-purpose bayonet which is described in another article.

For the more technically minded this Hungarian AK fires the Soviet 7.62-mm short round and, with a magazine capacity of 30 rounds, its maximum effective rate of fire is 90 rounds per minute on automatic and 40 rounds per minute on repetition. An infra-red sight can be fitted for night firing as shown in the picture. The useful effective combat range for this device is about 100 metres.

7.62-mm Hungarian AK Assault Rifle

UNIVERSAL BAYONET/TOOL



New Multi-purpose Scabbard and Bayonet

New Hungarian and East German models of the 7.62-mm AK Assault Rifle have appeared with an ingenious multi-purpose bayonet. Apart from its normally accepted, conventional role, this new bayonet is designed for use as a saw, knife and wire cutter. The scabbard and bayonet hilt are insulated to withstand a currently unexplained figure of 24,000 volts.

The Hungarians have regrettably made the point that the bayonet may not be used as a hammer as the slightest crack in the insulation will impair its effectiveness with possible disastrous effects on the user.

For the benefit of those of our new readers who may be unfamiliar with Soviet Army Terminology, the Soviets use the term "REGIMENT" where we use "BRIGADE". The radios dealt with in this article will therefore, as far as possible, be compared with those at present in service in the British Army operating from Brigade HQ forward.

The Soviets have five types of transmitter-receiver in this category, though one of them has four models covering different frequency bands. These are the R-104M, R-105d (R-108d, R-109d and R-114d), R-112, R-113, and R-126. The R-105d "family" has fairly recently blossomed forth into what we would call a "No 2" version, the R-105M (R-108M, R-109M and R-114M).

All are valve sets, though the power-supply units of some are transistorised. Re-chargeable batteries are used throughout. These are Nickel-cadmium except where otherwise stated.

The mechanical construction of the older types show a strong German influence obviously derived from design staff "acquired" at the end of World War II.

All are robust, reliable and very simple to operate.

In Motorized Infantry Companies and Coy Comd and PL Comds carry the VHF (FM) R-126 (Page 15(a)), which is about 2 lb lighter than our A40. It has continuous tuning giving 31 channels in the 48.5 - 51.5 Mc/s band compared to our 6 preset crystal controlled channels in the 47.5 - 54.5 Mc/s band. Power output and range are the same.

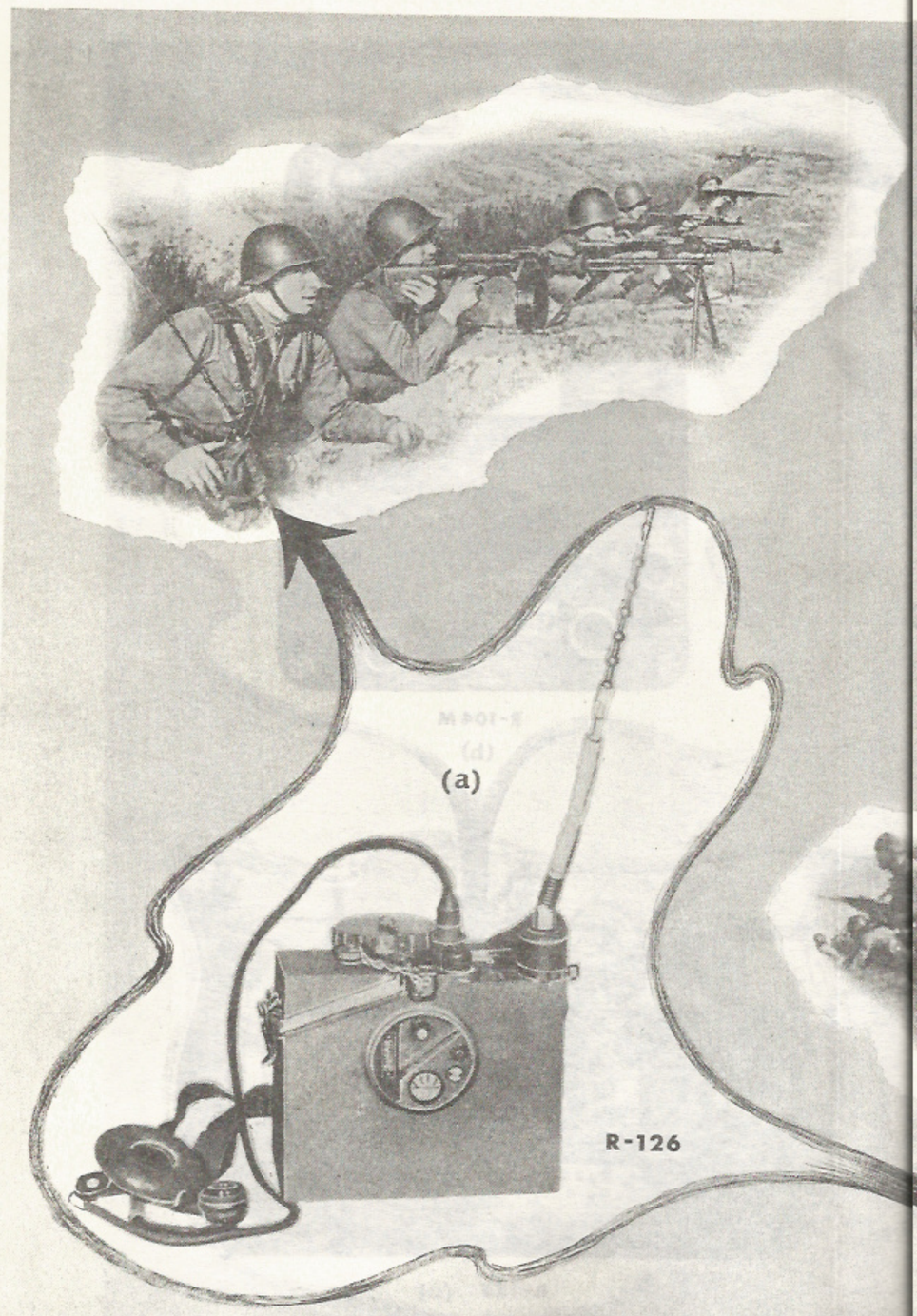
This set first appeared in the early 1960s and employs modern printed circuit techniques with miniature valves of a very robust type unique to the USSR. Its power supply is transistorised and the rechargeable silver-zinc battery at a transmit-receiver ratio of 1:3 gives 20 hours of operation between charges.

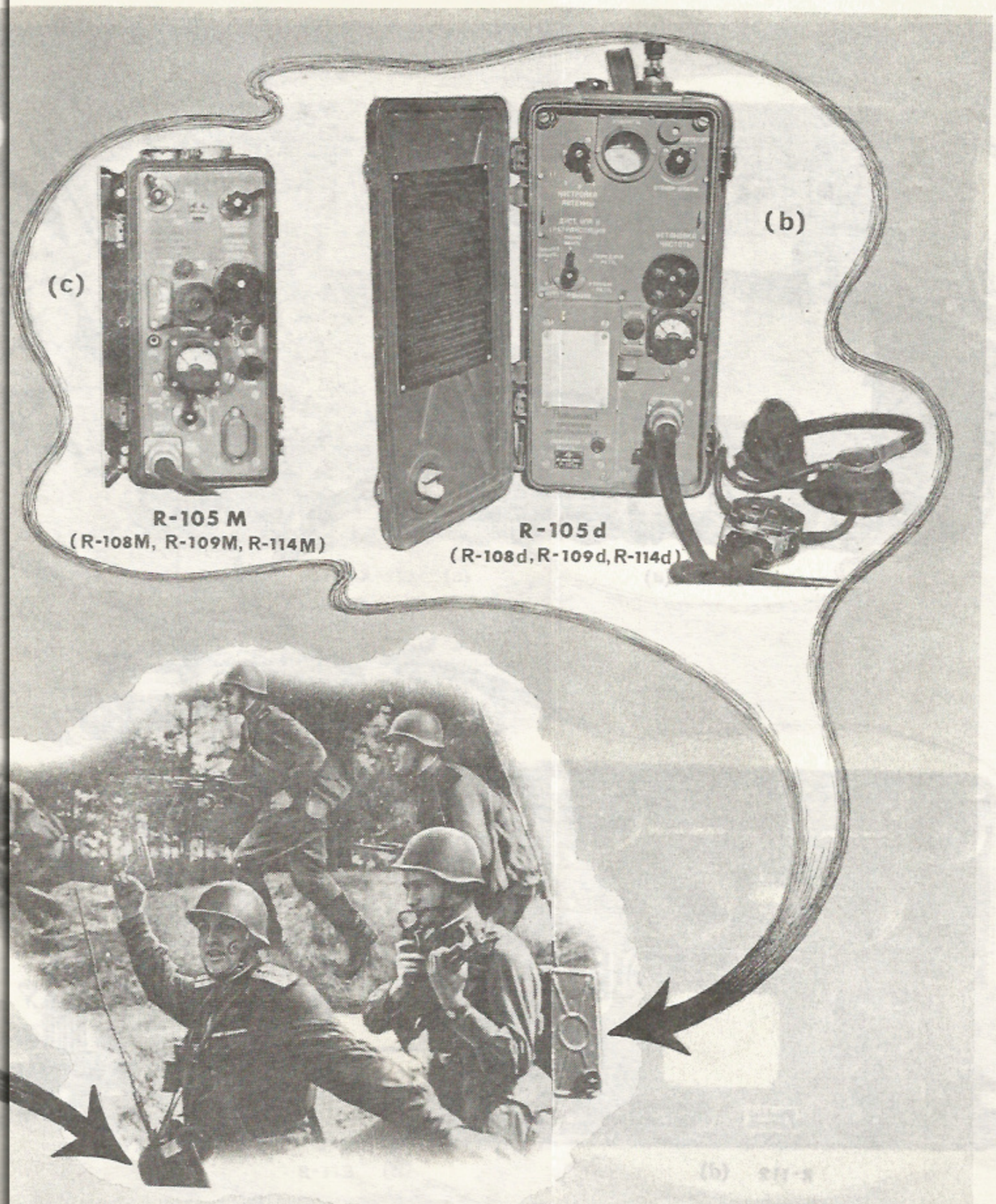
Unlike most military man-pack sets it is not back-packed but slung over the right hip by a shoulder strap. The headset has a single earphone with the microphone attached by a short boom so that it rests against the cheek. This leaves the Coy/Pl Comd's hands free, except when operating the transmit button on the set.

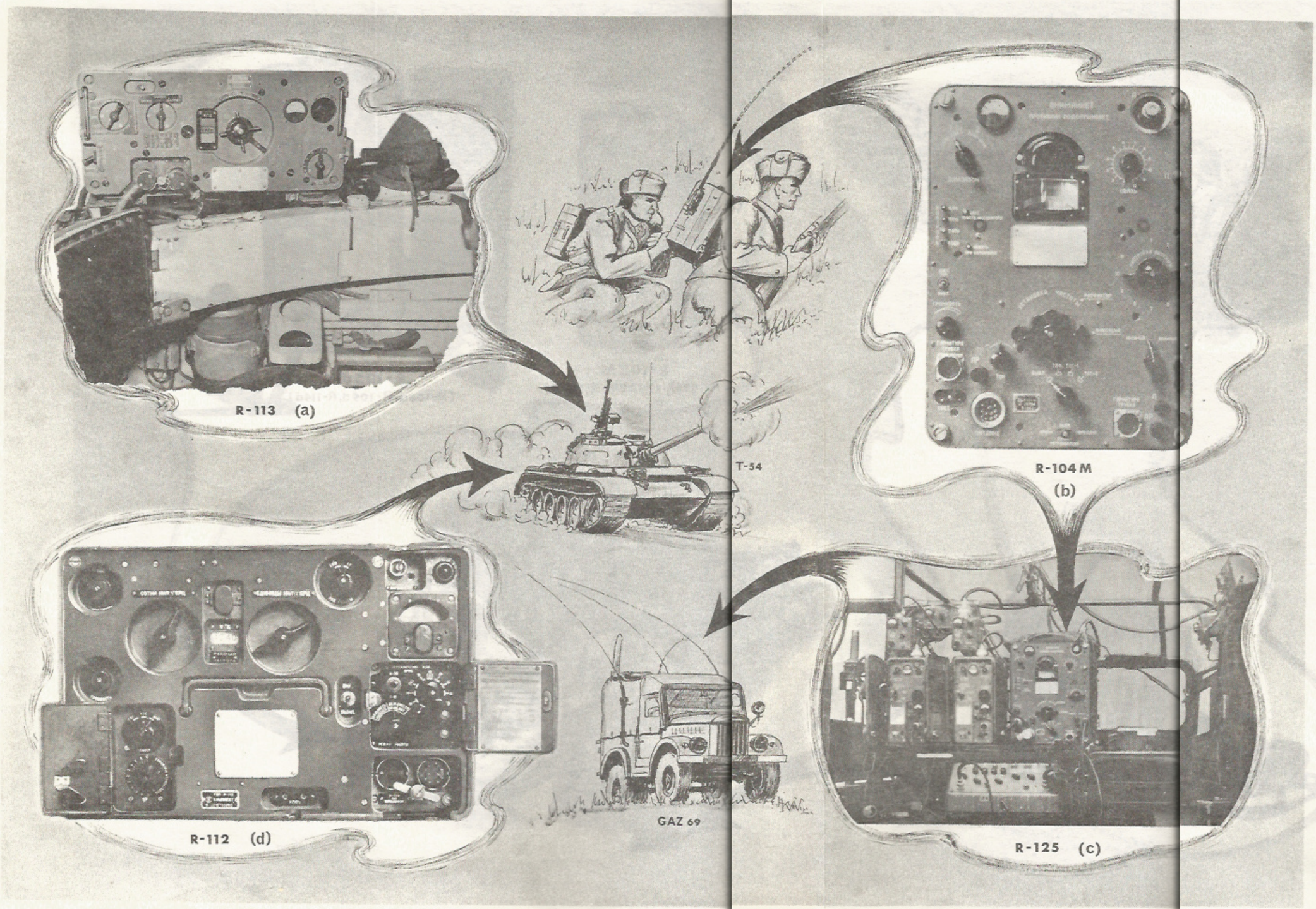
The Coy Comd's rear link is the VHF (FM) R-105d (Page 15(b)) carried by his radio operator. This set weighs 41 lb which is a good deal heavier than a bare A41, however as this includes the attached web carrying harness, its weight on Ivan's back, which is what counts, is only slightly more than that of the A41 on Tommy's back using the "Carrier Manpack GS" and less if using the "Carrier Radio Station Manpack", (44½ lb).

Like the A41 it is continuously tunable with crystal calibration but provides 203 channels in the 36 - 46.1 Mc/s band compared to only 171 in the 38 - 55 Mc/s band. Its power output (1.2 watts) is greater, as is also its range using similar antennas. Remote operation from a TAI-43R field telephone is possible up to a distance of 100 metres and manual re-broadcast facilities are incorporated. Its vibrator power supply operated by rechargeable batteries giving 12 hours of operation. It first appeared in the early 1950's and its mechanical construction is typical of World War II German sets. It is robust, very simple to operate and extremely reliable.

As we have progressed to the A41 No. 2, so the Soviets now have the R-105M (Page 15(c)) (M=modernised) which is a scaled-down version of the R-105d, weighing 31 lb. This is 4 lb less than the A41 No. 2 on the Carrier Manpack GS and is still one jump ahead of the A41 No. 2 in the number of channels provided, now 405 compared with 341). It uses miniature valves and components and a transistorised power supply. This set first appeared in the early 1960s and is gradually replacing its larger predecessor.


(a)
R-126


(b)
(c)
R-105 M
(R-108M, R-109M, R-114M)
R-105 d
(R-108d, R-109d, R-114d)


R-113 (a)
T-54
R-104 M
(b)
R-112 (d)
GAZ 69
R-125 (c)

It must not be thought from the foregoing that Ivan, or his Coy/Pl Comd, are always footslogging. Except when actually fighting they will be riding in their APCs, when they will have an additional set, the R-113 (Page 16(a)) which is the standard AFV set. This provides 96 fixed crystal controlled channels which is considerably less than its British equivalent, the C42. Its power output and range are the same and it is slightly smaller and lighter and very much simpler to operate. An important feature is a "voice" actuated transmit/receive switch, in addition to the normal manual switch in the throat-microphone lead. Its mechanical construction is similar to that of the R-105d though it first appeared in the late 1950s.

As the R-113 is installed in all tanks, the Soviet Coy Comd has no problem in communicating with any Armd support while in his APC. To enable him to continue to do so, when forced to move forward on foot, he is provided with an R-114d, which is identical to the R-105d but operates over the 20 - 26 Mc/s band, which more than covers that of the R-113. It also enables him to call forward his transport when required. An improved version, the R-114M, is also now in issue.

Moving back now to Bn HQ we have the R-105d (R-105M) working forward to Coy HQ, but we also find it working back to Regt HQ assisted if required by a 50 watt amplifier type UM. With this amplifier it can now be equated to the C42 (in its non-AFV roles) over which it has a range advantage of about 5 miles.

In addition the Bn Comd has an HF set which gives him either a VOICE or hand speed MORSE link to Rgt HQ. This is the R-104M (Page 16(b)), which has continuous tuning giving 275 crystal calibrated channels in the 1.5 - 4.25 Mc/s band. This is considerably less than that of the two possible British equivalents, the C12 or C11/R210. Its power output of 20W (CW) and 10W (VOICE) falls about midway between the two but the ranges claimed on similar antennas are comparable with those of the C11. It has facilities for remote control and manual re-broadcast and two transistorised power supply units in separate cases. These provide either a low power two-man pack version or a high power vehicle set.

A typical vehicle station is the R-125 (Page 16(c)) installed in the ubiquitous GAZ-69. This comprises two R-105d, each with 50 watt amplifier type UM, and one R-104M. The three radios are connected to an Operators Control Desk, which has provision for a fourth set, two remote telephone lines, and a Commander's Control Unit mounted in front of the passenger seat. By means of the control desk either one or two operators can set up and supervise calls over all the radios and control lines. In addition this control desk provides for either manual or automatic re-broadcast between any two of the radios.

The "Commander's Control Unit" incorporates an amplifier and loudspeaker and enables the Comd either to monitor up to four radios connected to the Operators Control Desk or make calls over them.

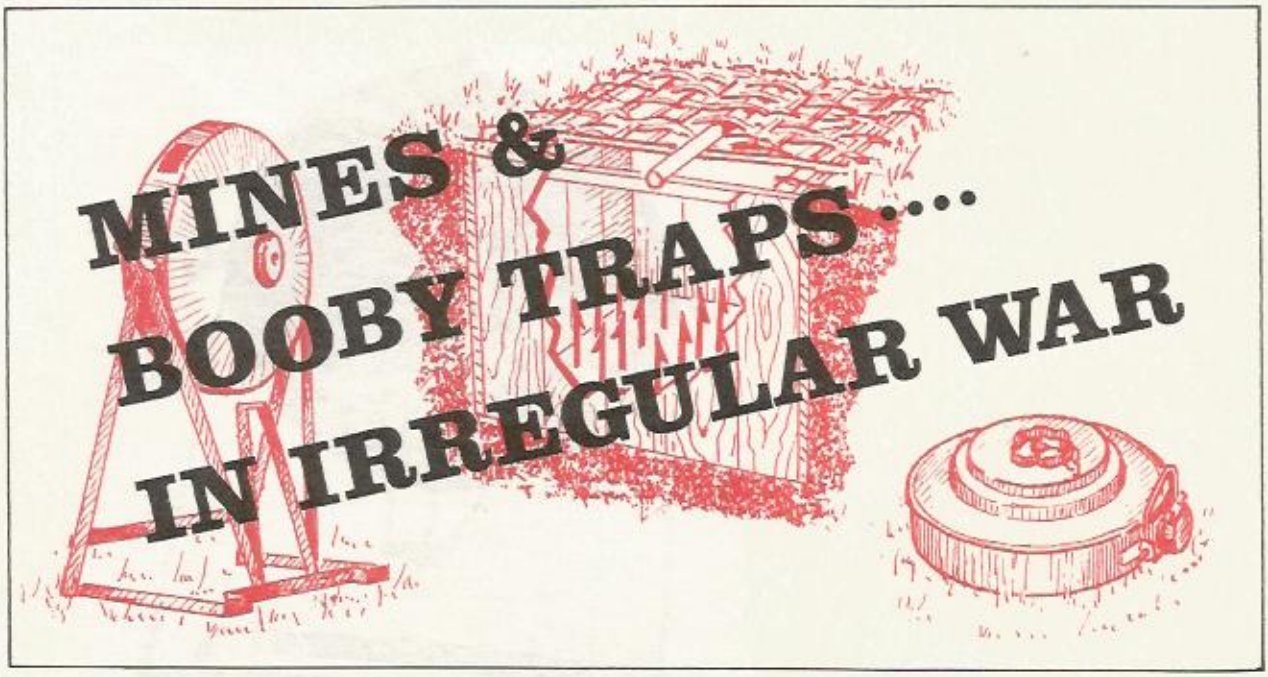
In Artillery units the roles of our A42, B48 and C45 are performed by the R-108d (Field Arty), R-109d (AD Arty) and R-113 (SP Arty). The R-108d and R-109d are identical to the R.105, but provide respectively 171 and 141 channels in the 28 - 36.5 and 21 - 28.5 Mc/s bands. Their replacements, the R-108M and R-109M, provide 341 and 281 channels.

Armoured units have, as already stated, the R-113 in every AFV. Comd AFVs have in addition an HF (AM) set the R-112 (Page 16(d). This provides VOICE or handspeed MORSE links between Coy, Bn and Regt Comds. It has 220 fixed crystal controlled channels in the 2.8 - 4.99 Mc/s band which is considerably less than the nearest British equivalent, the C13. Its power output of 50 watts is greater and it has correspondingly greater range. It appeared at the same time as the R-113, when both these sets replaced the Soviet equivalent to our 19 set.

It can be seen from the foregoing that the Soviet Army is by no means ill-equipped with radio sets. In general they compare favourably with our own, particularly when it is remembered that the earlier models have now been in service for over 10 years.

In conclusion we would like to repeat that all these sets are robust, reliable and simple to operate.

The following article may SAVE YOUR LIFE!! It is well worth the five minutes it takes to read.

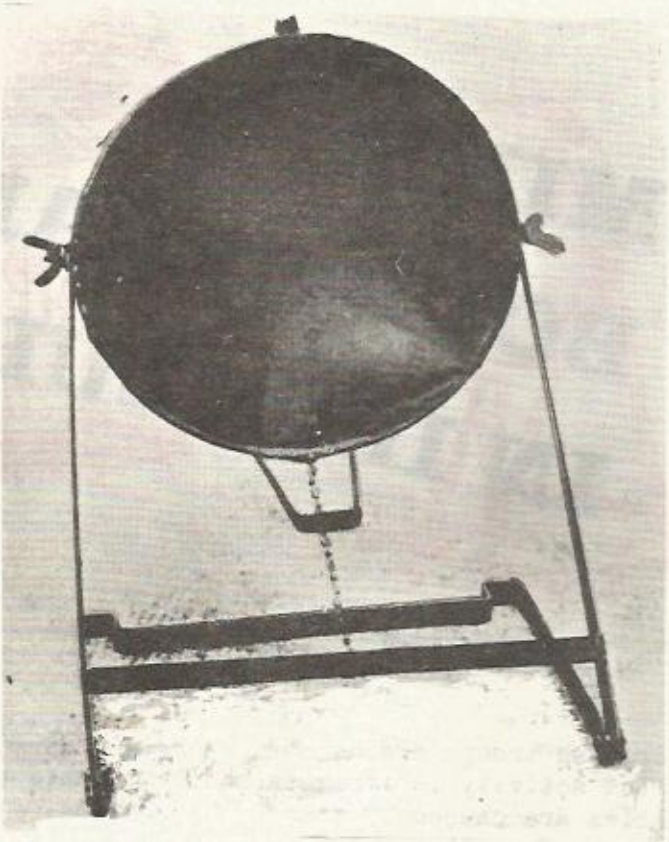


British troops are becoming more and more accustomed to combating terrorist activity in irregular war. In this type of warfare as many casualties are caused by mines and booby traps as by direct engagements with the enemy. It is appropriate therefore to review the sort of devices used by terrorists in these situations.

The terrorist devices will fall into one of three categories. They will either be made from standard factory produced mines and shells, locally manufactured mines, or improvised from any locally available material.

The terrorist normally obtains his standard equipments either by capturing them from an organised military force opposing him, or by receiving them from friendly forces outside his operational area. It would not be practical to list all the British, US and Soviet mines which have been used in this way. However, in Aden nearly all the mines employed recently by dissidents have been British Mk 7 or Mk 5 anti tank-mines. These are normally either detonated by pressure fuses or fired electrically by remote control. They are often booby-trapped, usually by linking a second mine which detonates when the first is disturbed. Anti-personnel mines may also be used either as a straightforward mine or as part of a booby-trap mechanism.

When the total of the supply of mines captured from their enemy plus those furnished by friendly forces is inadequate to satisfy the needs of the terrorists they will, if circumstances allow, set up their own munitions industry. Such conditions exist in Vietnam. The mines produced by the Viet Cong under such circumstances show a surprising degree of sophistication. The DH-10 directional mine (See page 20) made by the Viet Cong is such a weapon. It is primarily an anti-personnel mine but can be used against thin-skinned vehicles to good effect. The concave fragmentation face of the mine contains approximately 500 half-inch steel fragments backed by cast TNT. It is designed for electrical detonation and is provided with a frame so that it can be aimed. The mine exists in a variety of sizes, up to a maximum of about 12 inches in diameter.



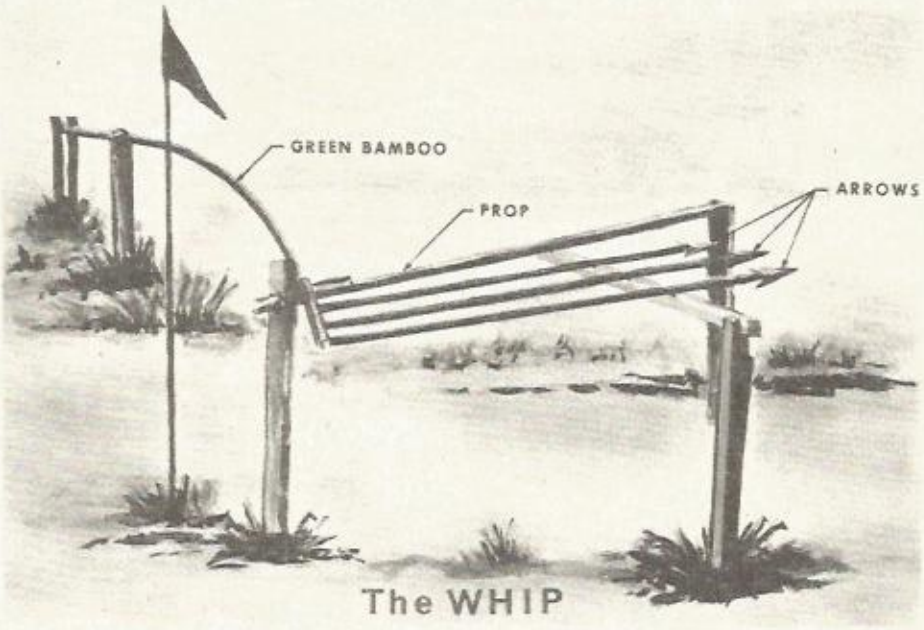
DH 10 Fragmentation Mine

If the terrorist cannot acquire or make his own weapons then he falls back onto improvising booby traps made from any locally available material. The variety of forms which such devices take is enormous. They may be explosive or mechanical, large or small, simple or complex. A few examples will serve to show the extent of the range.

The explosive variety of booby trap may incorporate a large quantity or only sufficient explosive to maim the individual handling it. Recently there has been an increasing tendency to incorporate a time delay mechanism which is usually improvised from a wrist watch. These devices can either be left laying around on an indiscriminate basis or directed towards a selected individual by such methods as sending them through the post. Recent samples have been disguised as fruit tins, fountain-pens, cigarette packets and photograph albums.

Explosive Cigarettes

Not all forms of booby trap have explosive in them. The Viet Cong have constructed a number based on spikes. There are many types of these spiked devices which may be placed at the bottom of pits, suspended overhead or mounted into the side of wooden frames. They are often poisoned and always unpleasant. Another variation is the 'Whip'. In this case the spikes, in the form of barbed arrows, are held against a bamboo spring and released by means of a trip wire. When activated the arrows are released to hit a target in the chest.



The WHIP

It might seem that this type of warfare is almost impossible to combat, but, awareness of the danger can reduce casualties. Tactical units should avoid areas which are known to be booby trapped, if possible, and leave them to be cleared by specialists later. All soldiers must, however, be alert to the danger and should be very suspicious of anything unusual, particularly of the following:

a. Any apparently valuable trophy such as binoculars, left in a place known to have been recently occupied by terrorists

b. Any broken down vehicle or obstruction in the middle of a track or road primarily used by military vehicles

c. Recently disturbed vegetation or earth

If a booby trap is discovered it should only be disarmed if the damage resulting from its destruction in place is politically or militarily unacceptable or if intelligence is required about the device. This is because of the possibility of it itself being booby trapped or having a time fuze incorporated.

You Have Been Warned